

**Resources for EAR Data and Sample Policy**  
**Division of Earth Sciences**  
**National Science Foundation**  
**Updated July 2023**

**Overview**

To facilitate adherence to the [EAR Data and Sample policy](#) and open science practices, including those articulated through the *FAIR Guiding Principles (Findable, Accessible, Interoperable, and Reusable)*<sup>1</sup> and the *CARE Principles for Indigenous Data Governance (Collective Benefit, Authority to Control, Responsibility, Ethics)*<sup>2</sup>, the NSF Division of Earth Sciences (EAR) offers this list of resources for EAR proposers and awardees. EAR recognizes that there is a large ecosystem of resources to support the management of data, samples, and other research products. This list is not exhaustive, nor is it meant to endorse particular resources. EAR will periodically update this page.

**NSF-wide resources**

- Dear Colleague Letter: Effective Practices for Data (NSF 19-069): [https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf19069](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf19069)
- NSF Public Access Initiative (PAI): <https://beta.nsf.gov/public-access>
- NSF Public Access Repository (NSF-PAR)
  - NSF-PAR search: <https://par.nsf.gov/>
  - Research.gov FAQs for Public Access: <https://www.research.gov/research-web/content/publicaccessfaq>

**OSTP (Office of Science and Technology Policy) resources:**

- Desirable Characteristics of Data Repositories for Federally Funded Research (2022): <https://www.whitehouse.gov/wp-content/uploads/2022/05/05-2022-Desirable-Characteristics-of-Data-Repositories.pdf>
- Ensuring Free, Immediate, and Equitable Access to Federally Funded Research (2022): <https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-Access-Memo.pdf>

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<sup>1</sup> Wilkinson, M., Dumontier, M., Aalbersberg, I., et al. The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* 3, 160018 (2016). <https://doi.org/10.1038/sdata.2016.18>

<sup>2</sup> Carroll, S.R., Garba, I., Figueroa-Rodríguez, O.L., et al., The CARE Principles for Indigenous Data Governance. *Data Science Journal*, 19(1), 43 (2020). <http://doi.org/10.5334/dsj-2020-043>

## **NSF-supported resources for data deposit, discovery, and access**

- Data-oriented resources
  - Arctic Data Center: <https://arcticdata.io/>
  - BCO-DMO (The Biological and Chemical Oceanography Data Management Office): <https://www.bco-dmo.org>
  - CCHDO (CLIVAR and Carbon Hydrographic Data Office): <https://cchdo.ucsd.edu/>
  - CUAHSI (Consortium of Universities for the Advancement of Hydrologic Science, Inc.) – Data services and software: <https://www.cuahsi.org/data-services/solutions>
    - HydroShare: <https://www.hydroshare.org/>
    - HydroClient: <https://data.cuahsi.org/>
  - CyVerse: <https://cyverse.org/>
  - CZNet (Critical Zone Collaborative Network) Data: <https://criticalzone.org/data>
  - DataONE: <https://www.dataone.org/>
  - DesignSafe-CI: <https://www.designsafe-ci.org/>
  - EarthChem (Including PetDB, LEPR, and Geochron): <https://www.earthchem.org/>
  - EDI (Environmental Data Initiative) Repository: <https://edirepository.org/>
  - GAGE (Geodetic Facility for the Advancement of Geoscience) data services: <https://www.unavco.org/data/data.html>
  - ICE-D (Informal Cosmogenic-Nuclide Exposure-Age Database): <https://version2.ice-d.org/>
  - MagIC (Magnetics Information Consortium): <https://www2.earthref.org/MagIC>
  - MGDS (Marine Geoscience Data System): <https://www.marine-geo.org/>
  - Morphobank: <https://morphobank.org/>
  - NCAR (National Center for Atmospheric Research) Research Data Archive: <https://rda.ucar.edu/>
  - Neotoma Paleoecology Database: <https://www.neotomadb.org/>
  - OpenTopography: <http://opentopography.org/>
  - PBDB (Paleobiology Database): <https://paleobiodb.org/>
  - Polar Geospatial Center: <https://www.pgc.umn.edu/>
  - SAGE (Seismological Facility for the Advancement of Geoscience) data services: <https://ds.iris.edu/ds/>
  - StraboSpot: <https://www.strabospot.org/>

- Vhub (volcano) / Ghub (Greenland ice sheet): <http://theghub.org>
- Education-oriented resources
  - SERC (Science Education Resource Center): <https://serc.carleton.edu/>
- Sample/collections-oriented resources
  - Continental Scientific Drilling Facility (includes former LacCore and CSDCO): <https://cse.umn.edu/csd>
  - iDigBio (Integrated Digitized Biocollections): <https://www.idigbio.org/>
  - IODP (International Ocean Drilling Program) core repositories: <https://www.iodp.org/resources/core-repositories>
  - Lamont-Doherty Core Repository: <https://corerepository.ldeo.columbia.edu/>
  - NSF Ice Core Facility: <https://icecores.org/>
  - Ohio State University – Polar Rocks Repository: <https://prr.osu.edu/>
  - Oregon State University – Marine and Geology Repository: <https://osu-mgr.org/>
  - System for Earth Sample Registration (SESAR): <https://www.geosamples.org/>
  - University of Rhode Island – Marine Geological Samples Laboratory: <https://web.uri.edu/gso/research/marine-geological-samples-laboratory/>
  - WHOI (Woods Hole Oceanographic Institution) Seafloor Samples Laboratory: <https://www2.whoi.edu/site/seafloorsampleslab/>
- Software/model-oriented resources
  - CIG (Computational Infrastructure for Geodynamics): <https://geodynamics.org>
  - CSDMS (Community Surface Dynamics Modeling System): <https://csdms.colorado.edu>
  - Generic Mapping Tools (GMT): <https://www.generic-mapping-tools.org/>
  - Water-Organic-Rock-Microbe (WORM) portal: <https://worm-portal.asu.edu/>

### **Other federal resources**

- DOE (Department of Energy) resources:
  - ESS-DIVE (Environmental System Science Data Infrastructure for a Virtual Ecosystem): <https://ess-dive.lbl.gov/>
  - KBase (Systems Biology Knowledgebase): <https://www.kbase.us/about/>
- NASA (National Aeronautics and Space Administration) resources:
  - Global Change Master Directory (GCMD): <https://gcmd.earthdata.nasa.gov/>
  - NASA Earth Science Data Systems (ESDS): <https://www.earthdata.nasa.gov/>

- NASA Transform to Open Science: <https://science.nasa.gov/open-science/transform-to-open-science>
- NSIDC (National Snow and Ice Data Center): <https://nsidc.org/>
- NIH (National Institutes of Health) resources:
  - GenBank: <https://www.ncbi.nlm.nih.gov/genbank/>
  - NCBI (National Center for Biotechnology Information) submission portal: <https://www.ncbi.nlm.nih.gov/home/submit/>
- NOAA (National Oceanic and Atmospheric Administration) resources:
  - National Environmental Satellite, Data, and Information Service (NESDIS): <https://www.nesdis.noaa.gov/>
  - NCEI (National Centers for Environmental Information) data submission and archival: <https://www.ncei.noaa.gov/archive>
  - NCEI data access (includes former National Geophysical Data Center, National Oceanographic Data Center, and National Climatic Data Center): <https://www.ncei.noaa.gov/access>
  - NOAA World Data System for Paleoclimatology: <https://www.ncei.noaa.gov/access/paleo-search/>
- Smithsonian Institution resources:
  - National Museum of Natural History (NMNH) Biorepository: <https://naturalhistory.si.edu/research/biorepository>
  - Smithsonian Environmental Research Center (SERC): <https://serc.si.edu/environmental-data>
- USGS (United States Geological Survey) resources:
  - Acceptable Digital Repositories for USGS Scientific Publications and Data: <https://www.usgs.gov/office-of-science-quality-and-integrity/acceptable-digital-repositories-usgs-scientific>
  - Guidance, best practices, and tools for data management: <https://www.usgs.gov/data-management>
  - USGS ScienceBase: <https://www.sciencebase.gov/catalog/>

### **Resource guides for data and sample sharing**

- American Geophysical Union (AGU), Data & Software for Authors: <https://www.agu.org/Publish-with-AGU/Publish/Author-Resources/Data-and-Software-for-Authors>

- Coalition for Publishing Data in the Earth and Space Sciences (COPDESS): <https://copdess.org/>
- Geological Society of America (GSA), Data Policy for Publications: <https://www.geosociety.org/gsa/pubs/datapolicy.aspx>
- Institutional Data Repositories: An Important Option for Complying with Data Sharing Requirements: <https://deepblue.lib.umich.edu/handle/2027.42/163716>
- Registry of Research Data Repositories (re3data) repository search tool: <http://www.re3data.org/>

### **Training information**

- DataONE – Data Management Skillbuilding Hub: <https://dataoneorg.github.io/Education/>
- Earth Science Information Partners (ESIP) - Data Management Training Clearinghouse: <https://dmtclearinghouse.esipfed.org/>
- GO FAIR – FAIR Principles: <https://www.go-fair.org/fair-principles/>
- The Carpentries (Data Carpentry, Software Carpentry, Library Carpentry): <https://carpentries.org/>

### **Other commonly used resources**

- For preparation of data management plans (DMPs)
  - DMPonline: <https://dmponline.dcc.ac.uk/>
  - DMPTool: <https://dmptool.org/>
  - ezDMP: <https://ezdmp.org>
- For data deposit and access
  - Dryad: <https://datadryad.org/>
  - GBIF (Global Biodiversity Information System): <https://www.gbif.org/>
  - Pangaea: <https://www.pangaea.de/>
  - Zenodo: <https://zenodo.org/>
- For open-source software development
  - GitHub: <https://github.com/>
  - Project Jupyter: <https://jupyter.org/>